has amended Fig. 27 to change the reference numeral designating the aforementioned gap to 2794. Applicant submits an amended Fig. 27 and a red ink sketch indicating the proposed change.

The Examiner has rejected claims 28-30 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states that claim 28 uses the phrase "plate portion is formed in a pre-loaded shape" and asks, "What is a pre-loaded shape?" Applicant submits that claim 28 recites "a plate portion of flexible material coupled to the attachment portion, wherein the plate portion is formed in a pre-loaded shape so as to exert pressure to the at least one die...." Referring to page 20, lines 17-23, applicant submits that a plate portion is described wherein such pressure is exerted, and it is stated that the plate portion "may be constructed of a deformable material that deforms under the pressure applied by the integrated circuits." Thus, a pre-loaded shape may be readily understood to be a shape "in a relaxed state" that is different from a shape that results when the pressure plate of a deformable material deforms under the pressure against the at least one die. An example is provided wherein "the curvature of arcuate portion 2169 may change when the integrated circuit cover is installed, even to the extent that the arcuate portion 2169 becomes flat or curved in an opposite direction. Thus, applicant submits that, in the context of the specification, the meaning of a "pre-loaded shape" can be understood. Therefore, applicant submits that claims 28-30 are in condition for allowance.

The Examiner has rejected claims 1-5, 15-19, 22, 23, 28, 29, 31-33, and 36-41 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. U.S. 2002/0079571, Application No. 09/379,537 of Takeuchi, et al. Referring to claim 1, the Examiner states that Takeuchi, et al. disclose an integrated circuit (IC) package comprising a plate portion (Figure 2, element 224), an attachment portion (Figure 2, element 230), and a spring portion (element 227) coupled to the plate portion and to the attachment portion. The Examiner states that Takeuchi, et al. do not specifically disclose an "integrated circuit cover," but alleges that they disclose what they refer to as a retainer frame (224), an attachment feature (230), and spring clips (227). The Examiner states that it is obvious that as the retainer frame coupled with the heat sink (215), a "cover" is formed, which cover is placed over the IC chip, as is taught by the present invention.

Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose or suggest the claimed invention as set forth in claim 1. For example, Takeuchi, et al. fail to disclose or suggest a spring portion coupled to the plate portion and to the attachment portion. Thus, applicant submits that claim 1 is in condition for allowance.

Regarding claims 2 and 26, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the IC cover is unitarily molded of a polymer material (Col. 2 [0020] third and fifth sentence)." Applicant submits that, while Takeuchi, et al. state, "In one embodiment, spring clip 227 is fabricated as an integral part of retention frame 224," Takeuchi, et al. fail to disclose or suggest an IC cover comprising a plate portion, an attachment portion, and a spring portion, wherein the IC cover is unitarily molded of a polymer material. For example, Takeuchi, et al. illustrate retention frame attachment feature 230 as a separate element, such as a screw, pin, or clip, not as part of an IC cover unitarily molded of a polymer material. Likewise, Takeuchi, et al. fail to disclose or suggest an attachment portion and a spring portion that are unitarily molded of a polymer material. Thus, applicant submits that claims 2 and 26 are in condition for allowance.

Regarding claim 3, the Examiner states that Takeuchi, et al. do not explicitly disclose "wherein the polymer material has a thermal conductivity of at least 10 watts/meter Kelvin." The Examiner asserts that Takeuchi, et al. teach the importance of removal of heat away from high performance microprocessors (i.e., IC circuits) and concludes that "[i]t would have been obvious, therefore, to modify the package as taught by Takeuchi, et al. to provide for polymer material that has a thermal conductivity of at least 10 watts/meter Kelvin to obtain the benefits of efficiently removing heat away from the IC chip."

Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. teaches away from an IC cover unitarily molded of a polymer material having a thermal conductivity of at least 10 watts/meter Kelvin. Rather, Takeuchi, et al. disclose a separate slug 215 "fabricated from a material having high thermal conductivity, such as copper or copper alloy" (column 1, paragraph [0015], first sentence). The reliance of Takeuchi, et al. on that separate slug for high thermal conductivity teaches away from an IC cover comprising a plate portion, an attachment portion, and a spring portion unitarily molded of a polymer material having a thermal conductivity of at least 10 watts/meter Kelvin. Rather, Takeuchi, et al. describes retention frame 224 (which the Examiner characterizes as being a plate portion), as capping and protecting substrate 218 and electronic chip 209 from physical damage and being fabricated from a material that is inexpensive and easily shaped, such as plastic, steel, or stainless steel (column 2, paragraph [0019], first three sentences). Applicant notes that, in the prior art, and presumably in Takeuchi, et al., materials such as plastic, steel, and stainless steel typically have lower thermal conductivity than copper or copper alloy, which applicant considers to be a further

indication that Takeuchi, et al. teaches away from the claimed invention as recited in claim 3. Thus, applicant submits that claim 3 is in condition for allowance.

Regarding claim 4, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing a heat sink (Figure 2 (215)) portion coupled to the plate portion." Applicant respectfully disagrees. As noted above, applicant submits that Takeuchi, et al. fail to disclose or suggest an IC cover comprising a plate portion, an attachment portion, and a spring portion, wherein the IC cover is unitarily molded of a polymer material. For example, Takeuchi, et al. illustrate retention frame attachment feature 230 as a separate element, such as a screw, pin, or clip, not as part of an IC cover unitarily molded of a polymer material. Thus, applicant submits that claim 4 is in condition for allowance.

Regarding claims 5 and 23, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the heat sink portion includes extended surfaces (Figure 3, extended surface (303) or (306), or both, depending on one's point of view)." Applicant respectfully disagrees. As noted above, applicant submits that Takeuchi, et al. fail to disclose or suggest an IC cover comprising a plate portion, an attachment portion, and a spring portion, wherein the IC cover is unitarily molded of a polymer material. For example, Takeuchi, et al. illustrate retention frame attachment feature 230 as a separate element, such as a screw, pin, or clip, not as part of an IC cover unitarily molded of a polymer material. Thus, applicant submits that claims 5 and 23 are in condition for allowance.

Regarding claims 15 and 16, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the spring portion, and a plurality of spring elements (note: Examiner is reading spring portion and spring element to refer to the same spring), is disposed at an end of the plate portion (see, for example, Figure 2, one of spring portions (227) at one end of plate portion (224))." Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose or suggest the claimed invention as set forth in claims 15 and 16. For example, Takeuchi, et al. fail to disclose or suggest a spring portion coupled to the plate portion and to the attachment portion. Thus, applicant submits that claims 15 and 16 are in condition for allowance.

Regarding claims 17 and 19, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plurality of individual spring elements are disposed a perimeter of the plate portion (see, for example, Figure 2, spring portions

(227))." Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose or suggest the claimed invention as set forth in claims 17 and 19. For example, Takeuchi, et al. fail to disclose or suggest a spring portion coupled to the plate portion and to the attachment portion. Thus, applicant submits that claims 17 and 19 are in condition for allowance.

Regarding claim 18, the Examiner states that Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein at least one of the individual spring elements is maintained in a non-relaxed state (see, for example, [0021] lines 9-11 counting from the bottom of the page). Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose or suggest the claimed invention as set forth in claim 18. For example, Takeuchi, et al. fail to disclose or suggest a spring portion coupled to the plate portion and to the attachment portion. Thus, applicant submits that claim 18 is in condition for allowance.

Regarding claim 22, the Examiner states that Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further comprising a heat sink portion coupled to the plate portion (Figure 2 (215) and (216)). Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose or suggest the claimed invention as set forth in claim 22. For example, Takeuchi, et al. fail to disclose or suggest a spring portion coupled to the plate portion and to the attachment portion. Thus, applicant submits that claim 22 is in condition for allowance.

Regarding claim 28, the Examiner states that "as far as claim 28 is in compliance with 35 U.S.C. 112 2nd paragraph and as well an an indefinite claim can be understood: Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plate portion is formed in shaped so as to exert pressure to the at least one die when the attachment portion is coupled to the circuit board (see, for example, last sentence of [0021]). Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose or suggest the claimed invention as set forth in claim 28. For example, Takeuchi, et al. fail to disclose or suggest an attachment portion adapted to be coupled to a circuit board, wherein at least one die is coupled to the circuit board. Rather, Takeuchi, et al. state, in paragraph [0019], penultimate sentence,"Retention frame attachment feature 230 is capable of attaching or coupling retention frame 224 to substrate 218." Substrate 218 is described, in paragraph [0018], second sentence, as "a substrate in a microelectronic package. Such substrates are provided with leads (as shown in Figure 2) to allow them to be coupled to a circuit board, but are not circuit boards. As such, Takeuchi, et al. teach away from the present invention, in that attachment retention frame 224 only to a substrate 218 of a single electronic chip would prevent

any application of the teachings of Takeuchi, et al. toward an ability to provide an integrated circuit cover not only capable of use over a plurality of integrated circuits, but also capable of accommodating variations in the mounted height of such integrated circuits, as provided in accordance with an embodiment of the present invention (page 7, lines 7-9).

As another example, Takeuchi, et al. fail to disclose or suggest a plate portion of flexible material coupled to the attachment portion, wherein the plate portion is formed in a pre-loaded shape so as to exert pressure to the at least one die when the attachment portion is coupled to the circuit board. Applicant can find no disclosure in Takeuchi, et al. of a plate portion of flexible material nor of a plate portion formed in a pre-loaded shape. Thus, applicant submits that claim 28 is in condition for allowance.

Regarding claim 29, the Examiner states that, "as far as claim 29 is in compliance with 35 U.S.C. 112 2nd paragraph and as well as an indefinite claim can be understood: Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plate portion is formed so as to exert pressure to at least one die in a direction toward the circuit board (Figure 2 (224)). Applicant respectfully disagrees. Applicant submits the reasons stated above with reference to claim 28 further apply to claim 29. Thus, applicant submits that claim 29 is in condition for allowance.

Regarding claim 31, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing a circuit board (Figure 6 (603))." Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose or suggest the claimed invention as set forth in claim 31. For example, Takeuchi, et al. fail to disclose or suggest "at least one die disposed on a first surface of the circuit board." As discussed above, Takeuchi, et al. fail to disclose either such a circuit board or such a relationship between at least one die and a first surface of a circuit board." As another example, Takeuchi, et al. fail to disclose or suggest an attachment portion attached to the circuit board. As yet another example, Takeuchi, et al. fail to disclose or suggest a spring portion coupled to the plate portion and to the attachment portion. Thus, applicant submits that claim 31 is in condition for allowance.

Regarding claim 32, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the spring portion exerts pressure between the plate portion and the at least one first die (see, for example, last sentence of [0021])." Applicant respectfully

disagrees. Applicant submits that the reasons stated above with respect to claim 31 further apply to claim 32. Thus, Applicant submits that claim 32 is in condition for allowance.

Regarding claim 33, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein at least one of the individual spring elements is maintained in a non-relaxed state (see, for example, [0021] lines 9-11 counting from the bottom of the page)." Applicant respectfully disagrees. Applicant submits that the reasons stated above with respect to claim 31 further apply to claim 33. Thus, Applicant submits that claim 33 is in condition for allowance.

Regarding claim 36, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, including the limitations recited in claim 36." Applicant respectfully disagrees. Applicant submits that Takeuchi, et al. fail to disclose the claimed invention as set forth in claim 36. For example, Takeuchi, et al. fail to disclose a plurality of spring portions coupled to the plate portion and to the plurality of attachment portions. Thus, Applicant submits that claim 36 is in condition for allowance.

Regarding claim 37, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein center lines of the plurality of spring portions are orientated so as to be non-radial relative to a centroid of the plate portion (Figure 2 (227)s)." Applicant respectfully disagrees. Applicant submits that the reasons stated above with respect to claim 36 further apply to claim 37. Thus, Applicant submits that claim 37 is in condition for allowance.

Regarding claim 38, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein each of the center lines of the plurality of spring portions are orientated approximately tangentially in relation to a corresponding one of the plurality of edges (Figure 2 (227)s)." Applicant respectfully disagrees. Applicant submits that the reasons stated above with respect to claim 36 further apply to claim 38. Thus, Applicant submits that claim 38 is in condition for allowance.

Regarding claim 39, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plurality of spring portions are oriented in a similar rotational direction with respect to a centroid of the plate portion (Figure 2, (227)s)." Applicant respectfully disagrees. Applicant submits that spring clips 227 of Takeuchi, et al. appear to be

configured in a symmetric manner and do not imply any rotational direction. Thus, Applicant submits that claim 39 is in condition for allowance.

Regarding claim 40, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plurality of spring portions are configured to cooperatively accommodate displacement of the plate portion from a relaxed position (first sentence [0020])." Applicant respectfully disagrees. Applicant submits that Takeuchi et al. fails to disclose or suggest displacement of a plate portion from a relaxed position. As the Examiner regards retention frame 224 as a plate portion, retention frame 224 is attached to substrate 224, preventing any displacement of it. As Takeuchi, et al. state in the last sentence of paragraph [0021], "...retention frame 224 caps substrate 218, and spring clip 227 exerts a constant force on slug 215 in order to maintain thermal coupling between electronic chip 209 and slug 215." Thus, Takeuchi, et al. teach away from displacement of a plate portion from a relaxed position, as any such displacement of retention frame 224 under the influence of spring clip 227 would counteract the force on slug 215 and impair the thermal coupling between electronic chip 209 and slug 215. Therefore, Applicant submits that claims 40 is in condition for allowance.

Regarding claim 41, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein at least one of the plurality of spring portions is maintained in a non-relaxed state when at least one of the plurality of attachment portions is coupled to a circuit board such that the plate portion overlies at least one IC (see, for example, Figure 6 and [0022])." Applicant respectfully disagrees. Applicant submits that Takeuchi et al. fail to disclose or suggest at least one of the plurality of attachment portions coupled to a circuit board. Rather, as the Examiner regards retention frame attachment feature 230 as an attachment portion, retention frame attachment feature 230 is described in paragraph [0019] as being capable of attaching or coupling retention frame 224 to substrate 218, not to a circuit board. As discussed above, that aspect of Takeuchi, et al. teaches away from the advantages of which the present invention is capable of providing. Therefore, applicant submits that claim 41 is in condition for allowance.

The Examiner has rejected claims 6, 24, and 30 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. U.S. 2002/0079571, Application No. 09/379,537 (Takeuchi et al.) in view of U.S. Patent No. 6,349,032 (Chan et al.). Regarding claims 6 and 24, the Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, except for disclosing wherein the heat sink portion includes fins. Chan et al. teach wherein heat sink portion

includes fins (Figure 1 (14))." The Examiner concludes that it would have been obvious to modify the device disclosed by Takeuchi et al. by providing for a heat sink including fins as disclosed by Chan et al." Applicant respectfully disagrees. Neither Takeuchi, et al. nor Chan, et al., either alone or in combination, disclose or suggest the claimed invention as set forth in claims 6 and 24. As an example with respect to claim 6, neither Takeuchi, et al. nor Chan, et al. disclose or suggest an IC cover unitarily molded of a polymer material. As an example with respect to claim 24, neither Takeuchi, et al. nor Chan, et al. disclose or suggest a spring portion coupled to the plate portion and to the attachment portion. Rather, Chan, et al. disclose damper springs 36a and 36b "disposed between the base of the heat sink 32 and the upper surface of the circuit card 3." Thus, the damper springs 36a and 36b of Chan, et al. are coupled to heat sink 32 and circuit card 3, and are not coupled to an attachment portion. Therefore, applicant submits that claims 6 and 24 are in condition for allowance.

Regarding claim 30, the Examiner states "as far as claim 30 is in compliance with 35 U.S.C. 112 2nd paragraph and as well as an indefinite claim can be understood: The proposed devise of Takeuchi et al. and Chan et al. discloses an integrated circuit (IC) cover, as recited above, further comprising a spring portion coupling the attachment portion to the plate portion (Chan et al., Figure 2 (34) and ((36a))." Applicant respectfully disagrees. Neither Takeuchi, et al. nor Chan, et al., either alone or in combination, disclose or suggest the claimed invention as set forth in claim 30. For example, neither reference discloses or suggests a spring portion coupling the attachment portion to the plate portion. Curiously, the spring portion, the attachment portion, and the plate portion constitute three elements, yet the Examiner cites only two elements (elements 34 and 36a) of Chan, et al. Presumably, the Examiner is asserting that element 34 of Chan, et al. constitutes an attachment portion and that element 36a of Chan, et al. constitutes a spring portion. If that is the Examiner's intent, no reference is made to any element of Chan, et al. allegedly constituting a plate portion. Even so, applicant can find no teaching in Chan, et al. of a functional coupling between damper spring 36a and fasteners 34. Rather, as Chan, et al. state, "Damper springs are disposed between the base of the heat sink 32 and the upper surface of the circuit card 3."

As another example, applicant can find no teaching in Takeuchi, et al. nor Chan, et al. of a plate portion of flexible material or a plate portion formed in a pre-loaded shape. Thus, Applicant submits claim 30 is in condition for allowance.

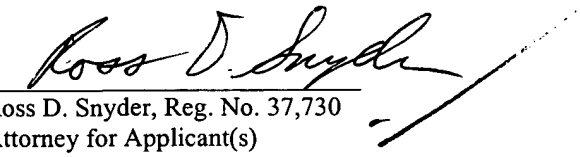
The Examiner has rejected claim 14 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. U.S. 2002/0079571, Application No. 09/379,537 (Takeuchi et al.)

in view of U.S. Patent No. 6,229,706 (Cook et al.). The Examiner states that "Takeuchi et al. disclose an integrated circuit (IC) cover, as recited above, except for disclosing wherein the spring portion has a cross section comprising a molded cantilever hinge portion. Cook et al. teach wherein the spring portion has a cross section comprising a molded cantilever hinge portion (Figure 1 (14) to provide initmate thermal contact between a heat sink and a heat generating electrical component such as an IC chip (Abstract)." The Examiner concludes that it would have been obvious to modify the device disclosed by Takeuchi et al. by providing for a spring portion having a cross section comprising a molded cantilever hinge portion as disclosed by Cook et al. Applicant respectfully disagrees. Applicant submits that neither Takeuchi, et al. nor Cook, et al., either alone or in combination, disclose or suggest the claimed invention as set forth in claim 14. For example, neither Takeuchi, et al. nor Cook, et al. disclose or suggest a molded cantilever hinge portion. Cook, et al. mentions, without explanation, a "reverse cantilever spring clip" in the title and abstract. Other than the title and abstract, applicant can find no other reference to and no explanation of "reverse cantilever spring clip" in Cook, et al. As noted, Cook, et al. mentions "reverse cantilever," not "cantilever," yet fails to define what Cook, et al. consider a "reverse cantilever" to be. Also, Cook, et al. does not mention "molded cantilever," nor "cantilever hinge." Thus, Applicant submits that Cook, et al. fails to disclose or suggest a spring portion having a cross section comprising a molded cantilever hinge portion." Therefore, Applicant submits that claim 14 is in condition for allowance.

In conclusion, Applicant has overcome all of the Office's rejections, and early notice of allowance to this effect is earnestly solicited. If, for any reason, the Office is unable to allow the Application on the next Office Action, and believes a telephone interview would be helpful, the Examiner is respectfully requested to contact the undersigned attorney.

Respectfully submitted,

17 October 2002
Date



Ross D. Snyder, Reg. No. 37,730
Attorney for Applicant(s)
Ross D. Snyder & Associates, Inc.
115 Wild Basin Road, Suite 107
Austin, Texas 78746
(512) 347-9223 (phone)
(512) 347-9224 (fax)